

Evaluation of MRI Findings in Low Back Pain: An Institution Based Study

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ABSTRACT

Introduction: The problem of low back pain not only has a greater incidence but also the handicaps a person in daily living which is more pronounced because of life style requirements. Many patients with minimal or no radiographic changes report a higher level of pain and definitive clinical findings. Hence, in view of this the present study was undertaken to evaluate the disability score and MRI findings in patients with low back pain.

Material and Methods: The study was conducted among 25 patients with low back pain for at least 1 month duration and had not responded to conservative treatment. Based upon various factors, a questionnaire was drafted to include patient's symptoms and activities. In all low back pain patients, MRI of lumbosacral spine was taken. Data so obtained was analyzed using Statistical Package for Social Science (SPSS) Version-16 data analysis software.

Results: The most common activity affected was forward bending (56%) followed by lifting and squatting, 12% each. Average disability score of the study group was 22.28. Average disability index was 37.13%. 100% patients showed disc blackening (hypointense disc), 52% patients showed disc protrusion, 52% patients showed Facets joint changes and 48 % patients showed annular tear.

Conclusion: The patients complaints (questionnaire grading) were not found proportionate to intensity of disc changes i.e. patient with severe disc changes on MRI were found to have minimal symptoms and findings also patients with aggravated symptoms had minimal MRI disc changes. MRI recommended for patients with persistent pain just as a base line tool.

Keywords: Low back pain; Lumbosacral spine; MRI.

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INTRODUCTION

Low back pain is defined as pain experienced in the lumbar region of the spine, or in the lumbosacral spinal and paraspinal regions.¹ A widely accepted definition of low back pain is pain, stiffness or muscle tension in the lower back, below the costal margin and above the inferior gluteal folds with or without leg pain.²

Most patients with back pain usually improve within 4 weeks of conservative management.³ In the situation where the patient is not able to carry out basic living requirements then further imaging is needed and the option of surgery in discogenic cases may be considered. Therefore in treatment planning, the decision making has to be based upon all these factors, especially the correlation between clinical findings and imaging pictures and the protocols revised accordingly.

The problem of low back pain not only has a greater incidence but also the handicap in daily living is more pronounced because of life style requirements. In the Indian house-hold women have

significant floor working for which they have to squat and sit cross-legged. The male population is mostly manual workers and their jobs also require a lot of squatting and heavy weight lifting. The higher incidence of low back pain in urban population is because of overall poor physical activity with excessive episodic strains.⁴ It has been our observation in day to day OPD practice that there is not always a proportionate correlation between the intensity of patient's symptoms, findings on examination, x ray picture and MRI findings. Many patients with minimal or no radiographic changes reported a higher level of pain along with definitive clinical findings. Moreover, Lrurhe NK et al⁵ conducted a study among Low Back Pain patients and revealed significant findings on Magnetic Resonance Imaging Scan.

Hence, in view of this the present study was undertaken to evaluate the disability score and MRI findings in patients with low back pain.

MATERIAL AND METHODS

The study was conducted among 25 patients who reported to the department of Orthopaedics with low back pain for at least 1 month duration and had not responded to conservative treatment. Each patient was analyzed on the basis of history; physical examination, a base line X-ray and MRI were taken. Patients with any spinal deformity, organic musculoskeletal or neurological disorder were excluded from the study.

Based upon various factors, a questionnaire was drafted to include patient's symptoms and activities. Grading was done from 0 to 4, with 0 meaning no problem and 4 meaning extreme disability. 12 questions were framed, having a possible maximum score of 48. Current international questionnaires are meant to be read and self-answered by patients. But in our situation, most people were illiterate, so the questions were read out to the patients in their language and answers marked on the sheet by the investigators.

Scores from questionnaire were grouped into 4.

Patients were graded as follows:

- 0 – 9 = None
- 10-19 = Mild
- 20-29 = Moderate
- >30 = Severe

The final score of the patient has been designated as 'Q' Score.

The low back pain disability questionnaire was framed in the following pattern:

1. When does pain start:

- A. During running/ brisk walking
- B. During normal walking
- C. During standing / sitting
- D. During lying down

2. How long have you been experiencing pain?

- A. 0-1 week
- B. 1-2 weeks
- C. 3-4 weeks
- D. 4-5 weeks

3. Lifting:

- A. I can lift any weight without extra pain
- B. I can lift moderate weight but heavy weight lifting gives me extra pain
- C. Pain prevents me lifting weight but I can manage light to medium weight if they are conveniently positioned
- D. I cannot lift or carry anything

4. Walking:

- A. I can walk unlimited distance
- B. I can walk limited outdoor but unlimited indoor
- C. I can walk limited indoor
- D. I am not able to walk at all

5. Sitting:

- A. I can sit with or without support as long as I like
- B. I can sit without support but pain prevents me sitting as long as I like
- C. I cannot sit without support but I can sit for limited duration
- D. I cannot sit at all even with support

6. Standing:

- A. I can stand as long as I want without extra pain
- B. I can stand but longer duration gives me some discomfort /pain
- C. I can stand but I need rest intermittently
- D. Pain prevents me standing at all

7. Sleeping:

- A. My sleep is never disturbed by pain
- B. My sleep is occasionally disturbed by pain [once a month]
- C. My sleep regularly disturbed by pain [once a week]
- D. Pain prevents me from sleeping daily

8. Squatting:

- A. I can squat for unlimited time
- B. Pain prevents me to squat but still I can squat
- C. Need to relax intermittently due to pain
- D. I am not able to squat at all

9. Bending:

- A. I can bend normally
- B. I can bend and touch both the knee and the floor with some discomfort
- C. I can bend and touch the knee but pain restricts me to touch the floor
- D. I cannot bend at all

10. Getting out of a bed or chair;

- A. I can get out of bed/chair without any pain or help
- B. I can get out of bed with some pain but without any help
- C. I need some help/support to get out of bed/ chair
- D. Pain is so severe that I am not able to get out of bed/ chair

11. Climbing;

- A. I can climb stairs without any pain /support
- B. I can climb stairs with some pain but without any support
- C. I need some help / support to climb the stairs
- D. Pain is so severe that I cannot climb the stairs

12. Overall level of activity;

- A. I can carry out my daily activities without any pain or support
- B. I can carry out my daily activities with some pain but does not need any support
- C. I need some help/ support to carry out my daily activities.
- D. Pain is so severe that I cannot carry out my daily activities.

In all low back pain patients, MRI of lumbosacral spine was taken. MRI was examined for disc changes (blackening, disc protrusion, annular tear and disc extrusion), spinal canal diameter, vertebral body changes and facets joint changes. Data so obtained was analyzed using Statistical Package for Social Science (SPSS) Version-16 data analysis software.

RESULTS

Table 1 reveals disability (grade 3) among various parameters. The most common activity affected was forward bending (56%) followed by lifting and squatting, 12% each. Average disability score of the study group was 22.28 (557/25) (table 2). Minimum score of disability was found to be 18 and maximum score of disability was 31. Average disability index was 37.13%. According to questionnaire score in the study group, 96 % patients had mild to moderate degree of overall difficulty and only 4 % patients had severe degree of difficulty (table 3). 100% patients showed disc blackening (hypointense disc), 52% patients showed disc protrusion, 52 % patients showed Facets joint changes and 48 % patients showed annular tear (table 4). In extrusion group of patients had a pain level score of 2, tenderness moderate, forward bending slightly decreased and SLR test was positive was found in 56% of cases (table 5). There was no statistically significant association between Questionnaire score and disc protrusion (p value=0.647), disc extrusion (p value=0.682), annular tear (p value=0.121) and facets joint changes (p value=0.08) (table 6).

Table 1: Showing disability (grade 3) among various parameters

Parameters	No. of Patients	Percentage of Patients
Lifting	3	12
Walking	0	0
Sitting	1	4
Standing	1	4
Sleeping	1	4
Squatting	3	12
Bending	14	56
Getting out of bed	0	0
Climbing	1	4
Overall level of activity	0	0

Table 2: Showing disability scores during various activities

S. NO.	Onset of pain	Duration	Lifting	Walking	Sitting	Standing	Sleeping	Squatting	Bending	Getting out of bed /chair	Climbing	Over all level of activity	Total score
1	1	4	3	2	1	2	1	1	3	2	1	2	23
2	2	4	2	1	1	1	1	3	3	1	2	2	23
3	1	4	2	1	2	2	1	3	3	1	1	2	23
4	2	4	4	2	3	2	3	2	2	2	3	2	31
5	2	4	1	2	2	2	1	1	2	2	2	2	23
6	1	4	2	2	1	2	1	1	3	2	2	3	24
7	2	4	2	2	2	2	1	1	2	2	2	2	24
8	2	4	1	2	2	2	1	3	2	1	2	2	24
9	4	4	1	2	1	3	1	1	3	2	1	2	25
10	1	4	3	2	2	2	2	1	2	2	2	2	25
11	2	4	2	1	2	2	1	2	3	1	1	2	23
12	1	4	1	1	1	2	1	2	3	1	2	2	21
13	2	4	2	1	1	2	1	2	2	1	1	2	21
14	3	4	2	2	1	1	2	2	2	1	1	2	23
15	2	4	1	1	1	2	1	1	3	1	1	2	20
16	1	4	1	1	1	2	1	2	3	1	1	2	20
17	2	4	1	1	1	1	1	1	2	1	1	2	18
18	2	4	1	1	1	1	1	2	3	2	2	2	22
19	1	4	1	1	1	1	1	2	2	1	1	2	18
20	2	4	2	1	1	1	1	1	1	1	2	2	19
21	1	4	1	2	1	1	1	1	3	1	2	2	20
22	2	4	2	2	1	2	1	2	3	2	2	2	25
23	1	4	2	1	1	1	1	1	3	1	2	2	20
24	1	4	1	1	1	1	1	2	2	1	2	2	19
25	2	4	2	2	1	1	1	2	3	1	2	2	23
													557

Table 3: Showing grading of Questionnaire score

Grade	Score range	No. of patients	Percentage
0=None	0-9	0	0
1=Mild	10-19	04	16
2=Moderate	20-29	20	80
3=Severe	>30	1	4

Table 4: Showing various changes observed on MRI

Parameters	No. of patients	% of patients
Disc Blackening	25	100
Disc protrusion	13	52
Disc extrusion	5	20
Annular tear	12	48
Spinal canal diameter decreased	0	0
Vertebral body changes	0	0
Facets joint changes	13	52

Table 5: Showing various parameters in disc extrusions patients

Patient no.	Pain level score	Tenderness	Bending	SLR	Questionnaire score
1.	2	NO	Normal	Positive	31
2.	2	Moderate	Normal	Negative	21
3.	2	Moderate	Decrease	Positive	22
4.	1	Moderate	Decrease	Positive	20
5.	2	NO	Decrease	Positive	23

Table 6: Showing association between Questionnaire score and disc changes revealed by MRI

Questionnaire score grade	Disc protrusion present	Disc protrusion absent	P value
Mild	3	1	0.647
Moderate + Severe	10	11	
Questionnaire score	Extrusion present	Extrusion absent	P value
Mild	0	4	0.682
Moderate + Severe	5	16	
Questionnaire Score grade	Annular tear Present	Annular tear absent	P value
Mild	0	4	0.121
Moderate + Severe	12	9	
Questionnaire score grade	Facets joint changes Present	Facets joint changes absent	P value
Mild	0	4	0.08
Moderate + Severe	13	8	

DISCUSSION

Non-specific or mechanical low back pain is pain originating from the spinal joints, vertebrae, soft tissues surrounding the spinal column and usually no pathology can be identified, and there is no structural abnormality of the back.⁶ This is the most common cause of low back pain. It is one of the most common patient complaint, and it is the leading cause to visit the doctor in India .The onset of non-specific back pain is often sudden. Most people experience pain primarily in the lower back (lumbo-sacral region).⁷ Low back pain is a complex symptom with many diverse causes for its presentation; there is no other part in the body that contains so many potentially pain causing structures in such a small area. Thus, the formation of a medical diagnosis is imperative to enable the clinician to arrive at a suitable treatment for the pain.⁸ The more important issue in the diagnosis of low back pain is differentiating the benign mechanical causes of low back pain from the serious and pathological causes.^{9,10} Most people experience back pain at some point in their lifetime. 85-90% of all episodes of back pain are non-specific or mechanical in nature. The yearly prevalence of low back pain varies; the life time prevalence can range up to 84 % and the monthly prevalence varies between 35% and 37%.¹¹ Low back pain has a high disability associated with it, which has led to an escalation in the medical based costs.^{12,13} It becomes imperative that the correct diagnosis of low back pain should be made as

early as possible, with the treatment applied, to prevent initial acute episodes from becoming a chronic condition. The differences in reported low back pain prevalence and associated factors are probably related to the design of the questionnaire. Self-reporting techniques can be considered to be important in the investigation of low back pain that includes self-assessment questionnaires and interviews by mail, telephone or face to face.¹⁴ In every examination procedure, the history is a significant part of the evaluation but in a busy OPD schedule, since it is difficult to take a detailed history, so a questionnaire becomes an important tool to cut short the non-relevant history. In a questionnaire, there is a specific set of questions on the basis of which the patient's level of pain and disability can be assessed. Some well-known available questionnaires are Roland Morris disability questionnaire,¹⁵ Oswestry low back pain disability questionnaire and Mc Gill pain questionnaire,¹⁶ for evaluation of severity of low back pain and associated disability. In these questionnaires the patient reads the manuscripts and tick marks the appropriate box.¹⁵ In the Indian scenario, the education profile of patients is different from developed countries, the input being from rural and semi urban areas, so questionnaires designed to be read by both educated and uneducated patients. Also squatting and bending activities are an integral part of daily working and lifestyle (toilet habits). So the available questionnaires are not completely suitable to evaluate back pain and related disability in our patients.

Based upon these various factors, a questionnaire was drafted to include patient's symptoms and activities as per Indian lifestyle/work needs. International questionnaires are meant to be read and self-answered by the patients but in our situation, since both literate and illiterate patients were present, so the questions although drafted in English, were read out to the patients in their language and answers were marked on the sheet by the investigators.

Regarding pain and disability score, we found that the average disability score was 22.28 and average disability index was 37.13%. In a study carried out by Horvath G et al¹⁷ the Oswestry disability index (ODI) was 35.1 %. de Goes Salvetti M et al¹⁸ had ODI mean disability score 33.1 %.

Similar findings were seen in other studies carried out by Fritz JM et al (42.9 %),¹⁹ Omid Kashani F et al (56.7%),²⁰ Dewing CB et al (53.6 %),²¹ Carragee EJ (47.2%),²² Ghatak RK et al (49.87%).²³ The high frequency of mild to moderate disability found can be explained by the fact that the sample exclusively comprised people with chronic low back pain, a condition with a highly disabling potential.

During assessment of patients by a questionnaire which includes statements about difficulty in daily activities like sitting, standing, walking, squatting and bending activities as reported by the patients, the present study found correlation between some of the activities like forward flexion. Similar correlation was also found in studies carried out by Steinberg EL et al²⁴ and Mc combe PF et al.²⁵

In the present study 100% prevalence of MRI findings was found i.e. every patient taken up for the study had some changes in the disc which could be attributed that in our study patients was selected for MRI only after definitive symptoms scores and findings whereas the probable reason for lesser prevalence seen in study conducted by Irlurhe NK et al¹⁴ as it was a retrospective radiological study not correlating the patients symptoms.

Low back pain is one of the most common causes of physician visits, with a huge socioeconomic burden. Because of this burden, new technologies have been quickly adopted with the hope that they will improve the physiopathology of the disease and assist us in managing patients' pain and discomfort.

Patient problems and complaints asked in a regular history taking tend to be more descriptive than to the point. Instead questionnaires are more specific and time saving. A back pain questionnaire should be designed and framed according to the life style of the patient i.e. if the patient cannot read or understand the questionnaire than it should be framed in the local language and should be read by investigator. Also activities not done by the patient should be excluded. This is a valid method for assessment of disability.²⁶

CONCLUSION

All the patients had mild to severe disc changes indicating functional deficiency of the disc but intensity of disc damage was not in proportion to symptoms. The patients complaints (questionnaire grading) and the clinical findings were not found proportionate to intensity of disc changes i.e. patient with severe disc changes on MRI were found to have minimal symptoms and findings also patients with aggravated symptoms had minimal MRI disc changes. Patient with low back pain presenting normal looking X ray should be thoroughly assessed on basis of

symptoms, activities and work demands and examined thoroughly specially with respect to neurological findings. MRI recommended for patients with persistent pain just as a base line tool. Decision regarding the treatment plan would that be symptoms and demand oriented.

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